AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

Please cancel claims 1-14 without prejudice or disclaimer and substitute new claims 15-49 therefor as follows:

1 - 14 (cancelled)

15. (New) A semiconductor optoelectronic waveguide comprising:

a second semiconductor clad layer arranged on each of one main surface and the other main surface of a semiconductor core layer having electro-optical effects;

a pn junction layer arranged on the second semiconductor clad layer laminated on one main surface of the semiconductor core layer wherein the side of the second semiconductor clad layer is a p-type and the side opposed to the second semiconductor clad layer is an n-type; and

a third semiconductor clad layer arranged on the pn junction layer and the second semiconductor clad layer laminated on the other main surface of the semiconductor core layer and functioning as an n-type electrode layer.

16. (New) The semiconductor optoelectronic waveguide according to claim 15, wherein

a first semiconductor clad layer is arranged between each of one main surface and the other main surface of the semiconductor core layer and the second semiconductor clad layer,

a band gap of the first semiconductor clad layer is greater than that of the semiconductor core layer, and

each band gap of the second semiconductor clad layer and the third semiconductor clad layer is greater than the band gap of the first semiconductor clad layer.

17. (New) The semiconductor optoelectronic waveguide according to claim 16, wherein the pn junction layer is established for the thickness of each layer and the impurity concentration in such a way that under an operating state of the semiconductor optoelectronic waveguide, the p layer is depleted in a whole range while the n layer is at least partially depleted.

18. (New) The semiconductor optoelectronic waveguide according to claim 17, wherein the impurity concentration is 1×10^{17} cm^{-3} or greater for the p layer of the pn junction layer and $5 \times 10^{17} cm^{-3}$ or greater for the n layer.

19. (New) The semiconductor optoelectronic waveguide according to claim 16, wherein the impurity concentration is 1×10^{17} cm^{-3} or greater for the p layer of the pn junction layer and $5 \times 10^{17} cm^{-3}$ or greater for the n layer.

20. (New) The semiconductor optoelectronic waveguide according to claim 16, wherein an impurity forming a deep level is doped on the n layer of the pn junction layer, in addition to an n-type impurity.

21. (New) The semiconductor optoelectronic waveguide according to claim 20, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

22. (New) The semiconductor optoelectronic waveguide according to claim 20, wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe.

23. (New) The semiconductor optoelectronic waveguide according to claim 16, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

24. (New) The semiconductor optoelectronic waveguide according to claim 23, wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe.

25. (New) The semiconductor optoelectronic waveguide according to claim 15, wherein the pn junction layer is established for the thickness of each layer and the impurity concentration in such a way that under an operating state of the semiconductor optoelectronic waveguide, the p layer is depleted in a whole range while the n layer is at least partially depleted.

26. (New) The semiconductor optoelectronic waveguide according to claim 25, wherein the impurity concentration is 1×10^{17} cm^{-3} or greater for the p layer of the pn junction layer and $5 \times 10^{17} cm^{-3}$ or greater for the n layer.

27. (New) The semiconductor optoelectronic waveguide according to claim 25, wherein an impurity forming a deep level is doped on the n layer of the pn junction layer, in addition to an n-type impurity.

28. (New) The semiconductor optoelectronic waveguide according to claim 25, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

29. (New) The semiconductor optoelectronic waveguide according to claim 15, wherein the impurity concentration is 1×10^{17} cm^{-3} or greater for the p layer of the pn junction layer and $5 \times 10^{17} cm^{-3}$ or greater for the n layer.

30. (New) The semiconductor optoelectronic waveguide according to claim 29, wherein an impurity forming a deep level is doped on the n layer of the pn junction layer, in addition to an n-type impurity.

31. (New) The semiconductor optoelectronic waveguide according to claim 29, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

32. (New) The semiconductor optoelectronic waveguide according to claim 15, wherein an impurity forming a deep level is doped on the n layer of the pn junction layer, in addition to an n-type impurity.

33. (New) The semiconductor optoelectronic waveguide according to claim 32, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

34. (New) The semiconductor optoelectronic waveguide according to claim 33, wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe.

35. (New) The semiconductor optoelectronic waveguide according to claim 32, wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe.

36. (New) The semiconductor optoelectronic waveguide according to claim 15, wherein a band gap energy of the n layer of the pn junction layer is smaller than that of the p-layer of the pn junction layer.

37. (New) The semiconductor optoelectronic waveguide according to claim 36, wherein the impurity having a deep level and doped on the n-layer of the pn junction layer is Fe.

38. (New) A semiconductor optoelectronic waveguide comprising;

a semiconductor core layer having effective electro-optical effects;

a first and a second semiconductor clad layers which vertically hold the semiconductor core layer and whose band gap is greater than that of the semiconductor core layer;

a third and a fourth semiconductor clad layers which vertically hold the first and the second semiconductor clad layers and contain an n-type dopant;

a fifth semiconductor layer having the first and the third semiconductor clad layers on the substrate side, which is arranged between the first semiconductor clad layer and the third semiconductor clad layer, containing a p-type dopant and whose band gap is greater than that of the semiconductor core layer;

at least one electrical isolation region formed by implanting ions into the fourth semiconductor clad layer to improve the quality of materials; and

electrodes individually provided at a major region other than the electrical isolation region of the fourth semiconductor clad layer and at the third semiconductor clad layer,

wherein voltage is applied to the semiconductor core layer.

39. (New) The semiconductor optoelectronic waveguide according to claim 38, wherein

the implanted ion species is an atom which forms an acceptor or a deep donor/acceptor pair level inside the fourth semiconductor clad layer.

40. (New) The semiconductor optoelectronic waveguide according to claim 39, wherein the fourth semiconductor clad layer is provided with three or more electrical isolation regions.

41. (New) The semiconductor optoelectronic waveguide according to claim 40, wherein an electrode is provided on the fourth semiconductor clad layer which is opposed to a major region of the fourth semiconductor clad layer across the electrical isolation region, and connected to an electrode of the third semiconductor clad layer.

42. (New) The semiconductor optoelectronic waveguide according to claim 39, wherein an electrode is provided on the fourth semiconductor clad layer which is opposed to a major region of the fourth semiconductor clad layer across the electrical isolation region, and connected to an electrode of the third semiconductor clad layer.

43. (New) The semiconductor optoelectronic waveguide according to claim 38, wherein the fourth semiconductor clad layer is provided with three or more electrical isolation regions.

44. (New) The semiconductor optoelectronic waveguide according to claim 43, wherein an electrode is provided on the fourth semiconductor clad layer which is

opposed to a major region of the fourth semiconductor clad layer across the electrical isolation region, and connected to an electrode of the third semiconductor clad layer.

45. (New) The semiconductor optoelectronic waveguide according to claim 38, wherein an electrode is provided on the fourth semiconductor clad layer which is opposed to a major region of the fourth semiconductor clad layer across the electrical isolation region, and connected to an electrode of the third semiconductor clad layer.

46. (New) A semiconductor optoelectronic waveguide comprising;

a semiconductor core layer having electro-optical effects;

a first and a second semiconductor clad layers which vertically hold the semiconductor core layer and whose band gap is greater than that of the semiconductor core layer;

a third semiconductor clad layer containing an n-type dopant which is arranged under the first semiconductor clad layer;

a fourth semiconductor clad layer which is arranged on the second semiconductor clad layer;

a fifth semiconductor layer in which the third semiconductor clad layer and the first semiconductor clad layer are arranged on the substrate side and a p-type dopant is contained between the second semiconductor clad layer and the fourth semiconductor clad layer and whose band gap is greater than that of the semiconductor core layer;

a major region of an n-type modulation waveguide formed inside a part of the fourth clad layer;

an isolation region adjacent to the major region, having a p-type electrical conductivity and in contact with an electrode common to the major region; and

another electrode provided on the third semiconductor clad layer,

wherein voltage is applied to the semiconductor core layer via both of the above-described electrodes.

47. (New) The semiconductor optical modulation waveguide according to claim 46, wherein a part of the major region of the n-type modulator waveguide inside the fourth clad layer is given a region having a p-type electrical conductivity and the region having the p-type electrical conductivity is provided with an electrode electrically common to the n-type major region.

48. (New) The semiconductor optoelectronic waveguide according to claim 47, wherein a pair of electrodes are provided on the fourth clad layer on both outer sides of the major region of the n-type modulator waveguide and each of the electrodes is connected to an electrode of the third semiconductor clad layer.

49. (New) The semiconductor optoelectronic waveguide according to claim 46, wherein a pair of electrodes are provided on the fourth clad layer on both outer sides of the major region of the n-type modulator waveguide and each of the electrodes is connected to an electrode of the third semiconductor clad layer.